

Table of comparative maximum and minimum temperatures for March.

State or Territory.	Station.	For 1887.		Since establishment of station.			
		Max.	Min.	Max.	Year.	Min.	Year.
Alabama	Mobile	76.8	36.2	85.0	1879	29.0	1885
Do	Montgomery	79.9	32.4	86.3	1882	25.0	1873
Arizona	Prescott	76.2	23.1	90.0	1879	8.0	1876
Do	Fort Apache	78.9	21.8	83.0	1879	11.0	1881
Arkansas	Fort Smith	76.0	28.0	82.8	1884	23.5	1884
Do	Little Rock	74.9	30.0	83.0	1882	23.0	1886
California	San Francisco	78.0	45.0	77.0	1879	39.0	1880
Do	San Diego	82.2	43.5	99.0	1879	38.0	1880
Colorado	Denver	74.7	13.2	81.0	1879	10.7	1886
Do	Pike's Peak	31.3	4.9	43.0	1879	29.0	1875
Connecticut	New Haven	51.4	11.5	69.0	1880	0.2	1885
Do	New London	53.3	15.2	64.0	1878	4.0	1884
Dakota	Fort Buford	59.0	9.8	70.0	1879, 1882	23.0	1880
Do	Yankton	77.5	1.5	87.0	1879	16.0	1876, 1880
District of Columbia	Washington City	65.0	20.8	79.0	1880	4.0	1873
Florida	Jacksonville	80.0	35.7	88.0	1882	31.0	1873, 1876
Do	Key West	81.6	58.4	89.0	1873, 1874	53.0	1873, 1886
Georgia	Atlanta	73.5	25.2	81.0	1882	20.4	1885
Do	Savannah	81.2	32.5	87.0	1882	27.0	1873
Idaho	Boise City	73.6	23.8	76.0	1881	9.0	1882
Illinois	Cairo	74.6	24.2	84.0	1879	10.0	1873
Do	Chicago	68.0	9.3	73.0	1875	12.0	1873
Indiana	Indianapolis	69.6	15.8	77.0	1875	3.2	1885
Indian Territory	Fort Sill	86.0	26.0	95.0	1879	10.0	1880
Iowa	Dubuque	70.5	1.7	75.0	1875	10.0	1875
Do	Des Moines	72.4	9.8	80.0	1880	5.6	1884
Kansas	Dodge City	80.1	16.6	89.0	1879	8.0	1880
Do	Leavenworth	83.6	20.5	84.0	1879	2.0	1876
Kentucky	Louisville	79.3	18.0	79.0	1879	3.0	1873
Louisiana	New Orleans	80.8	43.8	84.0	1879	36.0	1885
Do	Shreveport	83.8	34.6	90.0	1882	26.0	1876
Maine	Eastport	45.0	2.0	53.0	1878	7.9	1886
Do	Portland	46.4	0.5	65.0	1874	7.0	1872
Maryland	Baltimore	56.6	21.4	76.0	1880	5.0	1873
Massachusetts	Boston	52.9	9.8	72.0	1880	7.5	1872
Michigan	Marquette	46.1	14.2	70.0	1878	16.0	1884
Do	Grand Haven	59.8	7.4	71.0	1878	4.9	1885
Minnesota	Saint Vincent	45.0	27.0	49.0	1881	31.0	1883
Do	Saint Paul	53.6	7.1	68.0	1879	22.5	1873
Mississippi	Vicksburg	80.1	36.9	85.0	1880	27.0	1885
Missouri	Saint Louis	79.1	22.9	82.0	1879	8.0	1873, 1876
Montana	Fort Assinaboine	60.2	14.7	68.2	1885	25.8	1884
Do	Helena	67.4	4.2	66.0	1881	10.0	1886
Nebraska	North Platte	78.0	10.0	86.0	1879	21.0	1880
Do	Omaha	78.1	10.2	82.0	1879	7.0	1880
Nevada	Winnemucca	74.7	17.7	82.0	1879	3.0	1882
New Hampshire	Mount Washington	32.3	25.9	47.0	1876	49.0	1872
New Jersey	Atlantic City	56.2	18.4	72.0	1880	8.0	1884
New Mexico	Santa Fe	67.0	19.5	82.0	1879	0.0	1880
New York	Buffalo	51.0	11.4	72.0	1875	4.1	1885
Do	New York City	49.6	16.3	72.0	1879	3.0	1872
North Carolina	Charlotte	79.7	26.8	79.0	1879, 1880	23.0	1884
Do	Wilmington	81.9	27.7	84.0	1878	20.0	1873
Ohio	Cincinnati	73.0	18.6	77.0	1875	1.0	1873
Do	Sandusky	62.0	10.9	76.0	1886	3.4	1885
Oregon	Portland	75.2	31.2	79.0	1886	25.5	1880
Do	Roseburg	81.0	28.6	80.0	1881, 1883	19.0	1880
Pennsylvania	Pittsburg	68.5	14.9	80.0	1876	2.0	1877
Do	Philadelphia	53.3	21.8	75.0	1880	5.0	1872
Rhode Island	Block Island	53.7	17.2	66.0	1886	5.8	1886
South Carolina	Charleston	80.0	33.9	85.0	1882	28.0	1876
Tennessee	Knoxville	75.6	21.6	83.0	1882	6.0	1873
Do	Memphis	76.8	30.2	85.0	1879	18.0	1876
Texas	Brownsville	84.8	46.9	92.3	1884	35.0	1880
Do	Fort Elliott	82.8	24.0	86.0	1880	3.0	1880
Utah	Salt Lake City	73.9	27.5	77.0	1879	4.0	1874
Virginia	Lynchburg	80.6	23.5	79.0	1879	16.0	1884
Do	Norfolk	75.8	25.1	81.0	1880	16.0	1882
Washington Ter.	Spokane Falls	65.7	15.2	74.0	1881	7.0	1882
Do	Olympia	63.2	25.2	71.0	1881	23.1	1880
Wisconsin	La Crosse	65.9	1.0	72.0	1875	23.0	1873
Do	Milwaukee	56.8	4.2	70.0	1878	8.5	1884

18th, 19th, 20th, 23d, 24th, 25th, 30th; Sanford, 1st, 18th, 19th; Duke, 1st, 19th 20th, 24th, 30th; Manatee, 1st, 29th; Alva, 15th, 17th, 18th.

East Gulf states.—15th, 18th to 20th, 22d, 23d, 29th, 30th.

West Gulf states.—10th, 11th, 14th, 17th, 18th, 21st to 25th, 28th, 29th, 30th.

Tennessee.—11th to 15th, 18th to 20th, 23d, 25th, 28th to 31st.

Ohio Valley.—1st to 6th, 8th to 31st.

Lake region.—1st to 31st.

Extreme northwest.—2d to 10th, 12th to 31st.

Upper Mississippi and Missouri valleys.—1st to 31st.

Northern slope.—1st to 31st.

Middle slope.—1st to 12th, 15th to 23d, 25th to 28th, 30th, 31st.

Southern slope.—1st to 6th, 8th to 11th, 13th, 14th, 16th, 17th, 20th to 25th, 27th, 28th, 29th, 31st.

Southern plateau.—1st 2d, 3d, 5th to 13th, 15th to 18th, 20th to 25th, 28th to 31st.

Middle plateau.—1st to 23d, 25th to 31st.

Northern plateau.—1st, 3d, 4th, 5th, 8th to 13th, 16th, 18th to 23d, 25th to 30th.

North Pacific coast region.—1st to 4th, 10th, 12th, 17th to 22d, 26th, 27th, 29th, 30th.

Middle Pacific coast region.—1st, 5th, 6th, 8th, 18th to 21st.

ICE.

Ice formed in the southern parts of the country as follows:

Arkansas.—Lead Hill, 22d, 23d, 28th, 29th; Little Rock, 29th.

Georgia.—Savannah, 28th, 31st.

Louisiana.—Liberty Hill, 22d, 23d.

South Carolina.—Spartanburg and Stateburg, 15th, 18th, 19th, 20th, 29th, 30th; Charleston, 18th, 29th.

Texas.—Corsicana, 23d, 28th, Palestine, 28th.

TEMPERATURE OF WATER.

The following table shows the maximum and minimum temperature of the water at the several stations; the monthly ranges of water temperature; the mean water temperature; the average depth at which the observations were made; and the mean temperature of the air:

Temperature of water for March, 1887.

Station.	Temperature at bottom.		Range.	Mean water temperature.	Mean temperature of the air at station.	Average depth, feet and tenths.
	Max.	Min.				
Alpena, Mich. a	o	o	o	o	o	o
Baltimore, Md.	41.5	37.8	3.7	39.4	37.8	11.6
Boston, Mass.	37.9	31.0	6.9	34.5	31.6	22.9
Buffalo, N. Y. a	72.4	57.3	5.1	64.6	61.3	8.3
Cedar Keys, Fla.	58.9	54.3	4.6	56.6	54.8	36.0
Charleston, S. C. b	51.4	37.4	14.0	42.7	40.3	3.3
Chincoteague, Va.						
Cleveland, Ohio a						
Detroit, Mich. a						
Duluth, Minn. a	36.0	34.0	2.0	35.1	28.5	14.1
Eastport, Me.						
Escanaba, Mich. a	36.1	32.1	4.0	33.7	27.3	17.8
Grand Haven, Mich.	69.9	56.1	13.8	63.4	59.5	18.0
Jacksonville, Fla.	78.3	69.0	9.3	74.3	70.7	18.9
Key West, Fla.	57.0	52.3	4.7	54.6	58.9	16.2
Mobile, Ala.	57.0	52.3	4.7	54.6	58.9	16.2
New London, Conn.	38.2	33.1	5.1	35.7	34.3	14.9
New York City	49.3	44.2	5.1	46.4	44.1	15.7
Norfolk, Va.	68.4	58.3	10.1	64.4	60.2	18.0
Pensacola, Fla.	37.1	30.0	7.1	33.9	28.8	17.0
Portland, Me.	45.2	40.6	4.6	45.6	49.4	57.4
Portland, Oregon	38.0	33.0	5.0	35.1	31.6	11.5
Sandusky, Ohio c	59.4	53.3	6.1	56.4	56.5	10.3
Savannah, Ga.	42.5	33.2	9.3	38.2	31.8	15.8
Toledo, Ohio d						

a Frozen throughout the month. b Record for 26 days. c Record for 20 days; observations interrupted by ice. d Record for 29 days; observations interrupted by ice.

PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada for March, 1887, as determined from the reports of about six hundred stations, is exhibited on chart iii. In the

table of miscellaneous meteorological data are given, for each Signal Service station, the total precipitation, with the departures from the normal. The figures above the several geo-

tables and fruit, especially in the upper counties, while the freeze on the 29th and 30th was very disastrous throughout the state; much of the fruit which survived the first-mentioned frost succumbing to the latter. All the early varieties of peaches were killed. Plums and cherries suffered severely. Strawberries were set back about two weeks. In some instances potatoes were injured, while beans, cucumbers, and squashes were killed.

Frosts occurred in the various districts as follows:

New England.—1st to 31st.

Middle Atlantic states.—1st to 31st.

South Atlantic states.—1st, 2d, 3d, 10th to 20th, 22d, 23d, 24th, 26th, 29th, 30th, 31st.

Florida.—Cedar Keys and Limona, 1st; Archer, 1st, 2d, 15th,

graphical districts show the average precipitation and the average excess or deficiency as compared with the normal of each district. The normal for any district may be found by adding the departure to the current mean when the departure is below normal, and subtracting when above.

The precipitation of the month is generally below the normal in all parts of the country, except Washington Territory, southern Oregon, Idaho, extreme southern Texas, and parts of New England. The deficiency is especially large in the Gulf States and Tennessee, some stations showing a departure of over five inches; the total rainfall at several stations in these districts is less than 25 per cent. of the normal. In Tennessee, Kentucky, Mississippi, Alabama, and Georgia the greater part of the rainfall of the month fell on two days, the 6th and 7th; the precipitation in Tennessee, especially, being very heavy on these days, a number of stations in that state reporting two, and some over three, inches in less than thirty-six hours. At the end of the month the greater part of the state of Texas was still suffering from the effects of the protracted drought. The average normal rainfall for March of stations in New Mexico and Arizona is 1.22, while the average amount for the current month is only 0.07. At a majority of stations in these territories no rain fell during the month. In Washington Territory, Idaho, and northern Oregon the rainfall of the month is very large, the total amount at several stations being over ten inches, and two stations on the coast, Tatoosh Island, Wash., and Astoria, Oregon, over sixteen inches.

The following are some of the most marked departures from the normal precipitation at Signal Service stations:

Above normal.		Below normal.	
	Inches.		Inches.
Astoria, Oregon	12.34	Montgomery, Ala.	5.79
Tatoosh Island, Wash.	11.15	Atlanta, Ga.	5.30
Olympia, Wash.	5.79	Augusta, Ga.	4.96
Port Angeles, Wash.	2.22	Mobile, Ala.	4.55
Brownsville, Tex.	1.63	Hatteras, N. C.	4.15

DEVIATIONS FROM AVERAGE PRECIPITATION.

The following table shows, for certain stations, as reported by voluntary observers, the average precipitation for the month of March for a series of years, the precipitation for March 1887, and the departures from the average:

Station.	County.	Average pre- cipitation for March.	Number of years.	Precipitation for March 1887.	Departure.
<i>Arkansas.</i>					
Lead Hill	Boone	3.89	5	2.84	- 1.05
<i>California.</i>					
Sacramento	Sacramento	2.35	21	1.02	- 1.33
<i>Connecticut.</i>					
Canton *	Hartford	4.18	26	3.76	- 0.42
Hartford *	Hartford	4.01	16	3.52	- 0.49
Middletown *	Middlesex	4.42	29	4.62	+ 0.20
New Haven *	New Haven	4.73	15	4.22	- 0.51
Wallingford *	New Haven	4.64	29	5.05	+ 0.41
<i>Florida.</i>					
Archer	Alachua	6.51	4	4.14	- 2.37
<i>Illinois.</i>					
Collinsville	Madison	3.44	5	3.80	+ 0.36
Mattoon	Coles	3.45	7	3.20	- 0.25
Peoria	Peoria	2.61	31	0.94	- 1.67
Riley	McHenry	2.58	26	1.01	- 1.57
Sandwich	De Kalb	3.62	35	1.24	- 2.38
Sycamore	De Kalb	2.13	6	0.89	- 1.24
<i>Indiana.</i>					
Lafayette	Tippecanoe	2.20	8	1.41	- 0.79
Logansport	Cass	2.98	33	1.81	- 1.17
Vevay	Switzerland	3.98	21	2.78	- 1.20
<i>Iowa.</i>					
Monticello	Jones	2.44	34	2.45	+ 0.01
Muscatoine	Muscatoine	2.68	40	1.14	- 1.54
<i>Kansas.</i>					
Independence	Montgomery	2.10	15	2.18	+ 0.08
Lawrence	Douglas	2.11	19	2.75	+ 0.64
Wellington	Sumner	1.24	9	0.22	- 1.02
<i>Louisiana.</i>					
Grand Coteau	Saint Landry	6.88	4	2.28	- 4.60
<i>Maine.</i>					
Gardiner *	Kennebec	3.95	49	7.27	+ 3.32
Orono *	Penobscot	4.04	19	5.88	+ 1.84
<i>Maryland.</i>					
Cumberland	Alleghany	2.87	15	1.57	- 1.30
Fallston	Harford	4.38	16	3.61	- 0.77

Deviations from average precipitation—Continued.

Station.	County.	Average pre- cipitation for March.	Number of years.	Precipitation for March, 1887.	Departure.
<i>Massachusetts.</i>					
Amherst	Hampshire	3.40	52	4.18	+ 0.78
Cambridge	Middlesex	3.83	46	5.65	+ 1.82
Chestnut Hill	Middlesex	4.32	12	5.20	+ 0.88
Framingham	Middlesex	4.37	13	4.96	+ 0.59
Lake Cochituate	Middlesex	4.15	36	5.10	+ 0.95
Ludlow	Hampden	3.78	12	4.92	+ 1.14
Lynn	Essex	4.35	13	5.50	+ 1.15
Mystic Lake	Middlesex	4.25	12	5.04	+ 0.79
New Bedford *	Bristol	4.14	74	5.83	+ 1.69
Somerset	Bristol	4.59	17	5.03	+ 0.44
Springfield *	Hampden	3.62	40	4.19	+ 0.57
Waltham *	Middlesex	3.45	63	5.23	+ 1.78
Williamstown *	Berkshire	3.05	22	5.15	+ 2.10
<i>Nevada.</i>					
Carson City	Ormsby	1.63	8	0.23	- 1.40
<i>New Hampshire.</i>					
Concord *	Merrimac	3.00	31	3.04	+ 0.04
Hanover *	Grafton	2.14	21	2.43	+ 0.29
<i>New Jersey.</i>					
South Orange	Essex	3.68	17	2.45	- 1.23
<i>New York.</i>					
Factorville	Tioga	1.87	5	1.54	- 0.33
Palermo	Oswego	3.03	33	1.08	- 1.95
<i>Ohio.</i>					
Wauseon	Fulton	2.99	14	1.49	- 1.50
<i>Pennsylvania.</i>					
Dyberry	Wayne	3.07	18	3.55	+ 0.48
Gramplan Hills	Clearfield	4.07	17	2.49	- 1.58
<i>South Carolina.</i>					
Kirkwood	Kershaw	3.34	20	1.37	- 1.97
Stateburg	Sumter	3.62	7	0.97	- 2.65
<i>Texas.</i>					
New Ulm	Austin	5.07	15	1.27	- 3.80
<i>Vermont.</i>					
Lunenburg *	Essex	3.34	38	2.20	- 1.14
Newport *	Orleans	3.25	13	3.85	+ 0.60
Strafford	Orange	3.36	13	4.30	+ 0.94
<i>Virginia.</i>					
Bird's Nest	Northampton	4.59	19	4.70	+ 0.11
Dale Enterprise	Rockingham	3.24	7	3.03	- 0.21
Variety Mills	Nelson	4.18	8	2.97	- 1.21
Wytheville	Wythe	3.68	22	2.94	- 0.74
<i>West Virginia.</i>					
Helvetia	Randolph	4.80	11	3.02	- 1.78

* From the "Bulletin of the New England Meteorological Society."

The following notes on precipitation are furnished by voluntary observers:

Indiana.—Logansport, Cass Co.: the total snowfall of the present month, 5.4 inches, is 4.3 inches below the average for March of the past thirty-three years; the largest snowfall in that time was 29.2 inches, in 1869.

Iowa.—Monticello, Jones Co.: during the past thirty-four years the greatest March monthly precipitation, 6.54, occurred in 1877; the least, 0.07, in 1869; the greatest March monthly snowfall in that time, 26.6 inches, fell in 1876; the least, 0.0, in 1877; the snowfall of the present month, 16.0 inches, is 8.8 inches above the average.

New York.—Palermo, Oswego Co.: the total snowfall of the present month, 9.5 inches, is 4.0 inches below the average for March during the past thirty-three years.

Ohio.—Wauseon, Fulton Co.: during the past fourteen years the largest March precipitation, 6.52, fell in 1875; the smallest, 0.62, in 1885; the largest monthly snowfall, 41.7 inches, in 1877; the smallest, 0.2 inch, in 1878; the snowfall of the present month, 4.3 inches, is 8.0 inches below the average.

Pennsylvania.—Dyberry, Wayne Co.: in the past eighteen years the largest March precipitation, 5.78, fell in 1871; the least, 1.03, in 1885; the total snowfall of the present month, 23 inches, is 8 inches above the March average of the past thirty-three years; the largest March snowfall in that time, 38 inches, occurred in 1875; the least, 1 inch, in 1858.

Gramplan Hills, Clearfield Co.: the total snowfall of the month, 6.5 inches, is 11.1 inches below the normal of the past seventeen years.

Vermont.—Strafford, Orange Co.: during the past thirteen years the largest March precipitation, 7.10, occurred in 1876; the least, 1.55, in 1878.

Virginia.—Wytheville, Wythe Co.: the total precipitation of the three months ending March 31st, 9.58, is 0.99 below the average of the same months for the past twenty-two years.

SNOW.

Louisville, Ky.: snow began falling heavily during the night of the 29-30th and continued without cessation until the following night. This fall of snow, 12.4 inches, is the heaviest that has occurred here since 1869. The storm was general throughout the state; at Lexington a number of roofs were crushed by the weight of snow.

Lynchburg, Va.: snow began falling heavily during the early morning of the 31st and continued until 5.35 p. m.; total fall, 7.3 inches. Reports from the mountainous districts of the southwestern portion of the state indicate that the fall was

heavy; at Christianburg and Fincastle, snow fell to a depth of 9 inches.

The dates on which snow fell in the various districts are as follows:

New England.—1st, 2d, 4th to 30th.
Middle Atlantic states.—1st to 11th, 13th to 25th, 27th to 31st.
South Atlantic states.—14th, 18th, 21st, 27th to 31st.
West Gulf States.—Lead Hill, Ark., 21st, 28th.
Tennessee.—16th, 17th, 18th, 20th, 22d, 28th, 29th.
Ohio Valley.—1st, 4th, 5th, 13th to 23d, 26th to 31st.
Lower lake region.—1st, 4th to 7th, 13th to 31st.
Upper lake region.—1st, 4th to 7th, 10th, 11th, 13th, 14th, 16th, 17th, 18th, 20th to 31st.
Extreme northwest.—1st, 6th, 7th, 8th, 12th, 15th to 20th, 22d to 29th.
Upper Mississippi valley.—4th, 5th, 6th, 17th, 19th to 31st.
Missouri Valley.—1st to 7th, 9th, 13th, 14th, 15th, 18th to 31st.
Northern slope.—2d to 8th, 12th, 19th, 21st, 22d, 24th to 30th.
Middle slope.—3d, 4th, 5th, 7th, 19th, 24th, 26th, 27th, 28th, 30th, 31st.
Southern slope.—Fort Stanton, N. Mex., and Fort Davis, Tex., 27th.
Southern plateau.—Santa Fé, N. Mex., 4th, 26th, 27th; Lava, N. Mex., 27th.
Middle plateau.—3d to 6th, 8th, 17th, 18th, 25th, 26th.
Northern plateau.—1st to 8th, 17th, 18th, 22d, 30th.
North Pacific coast region.—4th, 9th, 12th, 15th, 19th, 23d, 26th, 27th.

MONTHLY SNOWFALLS.

[Expressed in inches and tenths.]

The following stations report a monthly snowfall of three inches or more:

California.—Summit, 14; Cisco, 8; Emigrant Gap, 7.
Colorado.—Pike's Peak, 14.3; Montrose, 4.
Connecticut.—North Colebrook, 26.2; Canton, 14.5; Collinsville, 12.8; Bethel, 10.2; Hartford, 9; Middletown, New London, and New Haven, 3.
Dakota.—Richardton, 11; Bismarck, 7.6; Parkston, 6.5; Fort Totten, 6.3; Huron, 5.1.
District of Columbia.—Washington City, 4.7; Kendall Green, 3.3.
Illinois.—Lake Forest, 12; Windsor, 11.9; Rockford, 11.2; Cedarville, 10.8; Pekin, 9.5; Joliet, Oneida, and Sandwich, 9; Minonk, 7.5; Woodstock, Sterling, and Peoria, 7; Riley and Aurora, 6.5; Martinsville and Chicago, 6.2; Waukegon and Monmouth, 6; Payson, 5.5; Ottawa, 5.2; Collinsville, 5; Belvidere, Pontiac, and Camden, 4; Mattoon, 3.9; Hoopeston, 3.8; Melvin, 3.7; Sycamore and Griggsville, 3.5.
Indiana.—Jeffersonville, 15; Laconia, 12; Logansport, 5.4; Vevay, 5; La Grange and Indianapolis, 3.
Iowa.—Des Moines *a*, 18; Cedar Rapids *a*, 16.5; Monticello, 16; Dubuque, 14.7; Oskaloosa *a*, 13.5; Independence, 12.5; Cedar Rapids *b*, 12; Des Moines *b*, 10.8; Muscatine, 9.1; Oskaloosa *b*, 9; Davenport, 7.8; Clinton, 7; Cresco, 6.5; Keokuk, 6.2; Bancroft, 5.
Kansas.—Wakefield, 7.4; Globe, 7; Leavenworth, 6.8; Wyandotte, 6.2; Manhattan *a* and Lawrence, 6; Manhattan *b*, 4; Belleville, 3.
Kentucky.—Harper's Ferry, 15.6; Midway, 13; Louisville, 12.4.
Maine.—Kent's Hill, 31; Cornish, 29; Portland, 27.6; Orono, 26.5; Lewiston, 26.1; Gardiner, 25.1; Belfast, 19; Eastport, 18.1; Bar Harbor, 14.
Maryland.—Fallston, 15; Woodstock, 9.5; New Midway, 8.2; Baltimore, 6.8; Cumberland, 6.
Massachusetts.—Rowe, 35; Williamstown, 34; Dalton, 30; Gilbertville, 25; Fitchburg *a*, 22; Fitchburg *b*, 21.8; Monson, 21; Ludlow, 20.5; Mansfield, 19.8; Concord, 18.2; Somerset, 18; Worcester, 16.7; South Hingham, Blue Hill Observatory, and Dudley, 16; Plymouth and Deerfield, 15; Amherst *a*, 14.5; North Truro, 14.4; Milton, 14.2; Westborough, 14; Spring-

field and Amherst *b*, 13.5; Groton and Newburyport, 13; Northampton and Fall River, 12; Taunton *a*, 11.8; Boston and Lawrence, 11.5; New Bedford *a*, 10.5; Randolph and Taunton *b*, 10; New Bedford *b*, 9; Cambridge, 8.3; Nantucket, 4.4.

Michigan.—Traverse City, 17.5; Harrisville and Lansing, 11.5; Detroit, 11.4; Alpena and Thornville, 10.5; East Saginaw, 7.8; Benton Harbor, 7.5; Ovid and Mottville, 7; Saint John's, 6.8; Kalamazoo, 6.2; Saint Louis and Grand Rapids, 6.1; Cassopolis, 6; Alma, 5.7; Mackinaw City and Greenville, 5.3; Detroit, 5; Jonesville, 4.5; Ganges, 4; Adrian, 3.8; Birmingham and Port Huron, 3.

Minnesota.—Duluth, 5.4; Spring Valley and Rochester, 5.2; Minneapolis and Saint Vincent, 4.9; Red Wing, 3.8; Albert Lea, 3.7; Eau Claire and Moorhead, 3.5.

Missouri.—Saint Louis, 3.5.

Montana.—Fort Maginnis, 12.4; Fort Custer, 3.9.

Nebraska.—Hay Springs, 7.5; Brownville, 7.2; Valentine, 7; Fairbury, 6.5; De Soto, 5.6; Lincoln, 5.2; Omaha, 4.8; Genoa, 3.7; North Platte, 3.4; Fremont, 3.3.

New Brunswick.—Parker's Ridge, 36.

New Hampshire.—Shelburne, 38; Berlin Mills, Grafton, and Mount Washington, 33; Quincy, 30; Strafford, 24; Hanover, 22.5; Walpole, 21.5; Concord, 20; West Milan, 19.2; Manchester *a*, 16; Manchester *b*, 15, *c*, 12.6; Nashua, 13.5.

New Jersey.—Clayton, 11.2; Atlantic City, 7; South Orange, 6.8; Dover, 6; Beverly, 4.8; Roseland, 4.5; Moorestown, 4.3.

New Mexico.—Santa Fé, 3.5.

New York.—Lebanon Springs, 37; Cooperstown, 33.5; Auburn, 24; Albany, 22.2; Menands, 20.1; Oswego, 16.6; Humphrey, 12.8; Boyd's Corners, 11; White Plains, 10.2; Le Roy, 9.7; Palermo, 9.5; Ithaca, 8.9; Buffalo, 7.9; Penn Yan, 7.5; Rochester, 6.3.

North Carolina.—Reidsville, 4.

Ohio.—Cleveland, 10.1; Yellow Springs, 9.3; Garrettsville, 5.3; Ruggles, 5; Lewisburg, 4.5; Wauseon, 4.3; Portsmouth and Tiffin, 4; Sandusky, 3.2; Jacksonborough, 3.

Pennsylvania.—Dyberry, 23; Blooming Grove, 18.5; West Chester, 9.2; Bethlehem, 7.2; Grampian Hills, 6.5; Wilkesbarre and Erie, 5.5; Wellsborough, 4.6; Easton, 4.5; Pittsburgh, 4.4; Philadelphia, 3.2.

Rhode Island.—Bristol, 11.5; Providence, 9; Woonsocket, 7.2; Olneyville, 7; Block Island, 6.7.

Utah.—Frisco, 3.1.

Vermont.—Strafford, 53; Northfield, 44.9; Townshend, 43.3; Charlotte, 37; Jacksonville, 36.5; Burlington, 35; Marlborough, 31.6; Newport, 29.5; Chelsea, 27.5; Poultney, 25.6; Brattleborough, 23.8; Lunenburg, 22; Vernon, 20.

Virginia.—Lynchburg, 13.8; Dale Enterprise, 13.5; Bruington, 10; Rappahannock, 5.3; Marion and Wytheville, 4.5; Chincoteague, 4.4; Variety Mills, 3.9.

West Virginia.—Middlebrook, 25.5; Helvetia, 12.5.

Wisconsin.—Fond du Lac, 11; Milwaukee, 10.9; Franklin, 10; Delavan, 9.2; Prairie du Chien, 7; Manitowoc, 6.2; Green Bay, 4.7.

Wyoming.—Camp Sheridan, 6.5.

DEPTH OF UNMELTED SNOW ON GROUND AT END OF MONTH.

[Expressed in inches and tenths.]

Connecticut.—North Colebrook, 26; Bethel, trace.

Dakota.—Fort Totten, 1; Fort Buford, trace.

District of Columbia.—Washington City, 1.

Illinois.—Chicago, trace.

Indiana.—Laconia, 12; Jeffersonville, 6; Vevay, 1; La Grange, trace.

Iowa.—Des Moines *a*, 6 to 8; Cedar Rapids *a*, and Monticello, 6; Independence and Cedar Rapids *b*, 2 to 3; Des Moines *b*, 2; Oskaloosa, 1.5; Muscatine and Dubuque, 1; Cresco, 0 to 3.

Kansas.—Wakefield and Wyandotte, trace.

Kentucky.—Midway, 10; Harper's Ferry, 9; Louisville, 2.7.
Maine.—Cornish, 36; Gardiner, 24; Orono, 8; Bar Harbor, 3; Portland, 2; Eastport, 1.

Maryland.—Fallston and New Midway, 4; Baltimore, 3; Woodstock, 2.

Massachusetts.—Deerfield, 12; Blue Hill Observatory, North Truro, Taunton, Somerset, and Westborough, trace.

Michigan.—Escanaba and Mackinaw City, 14; Alpena, 7; Marquette, 5; Lausling, 1.5; Grand Haven, 1; Port Huron, 0.5.

Minnesota.—Saint Vincent, 2.2; Duluth, 2; Saint Paul, trace.

Missouri.—Centreville, trace.

Montana.—Poplar River, trace.

Nebraska.—Brownville, trace.

New Hampshire.—Mount Washington, 20; Manchester, 14; Nashua, trace.

New Jersey.—Clayton and Atlantic City, 3; Lakewood and Moorestown, 1.5; Beverly, 1.2; Dover and South Orange, trace.

New York.—North Volney 30 (in the woods); Cooperstown, 20; Palermo, 12; Albany, 9; Menands, 6; Oswego, 0.5; Ithaca and Le Roy, trace.

North Carolina.—Reidsville, 3.

Ohio.—Portsmouth, 4; Yellow Springs, 0.8; Elyria, trace.

Pennsylvania.—Dyberry, 24; Blooming Grove, 5; Fallington, 1.5; West Chester, 1; Philadelphia, 0.3; Grampian Hills, Phillipsburg, Quakertown, and Erie, trace.

Vermont.—Charlotte, 60 to 120; Strafford, 48; Newport, 40; Northfield, 36; Brattleborough, 24.5; Poultney, 20; Burlington, 8.

Virginia.—Lynchburg, 7; Dale Enterprise, 4.5; Variety Mills, 3.2; Rappahannock, 2.1; Chincoteague, 1.5; Marion, 1.

West Virginia.—Middlebrook, 6; Helvetia, 1.

Wisconsin.—Wausau, 8; Franklin, 4; Madison, 3; Fond du Lac and Milwaukee, 2; Embarras, 0.8; La Crosse, trace.

HAIL.

Little Rock, Ark.: on the 10th a violent wind and hail storm visited Bradley county in this state. The storm was very destructive, blowing down a number of houses and barns and injuring several persons. Large tracts of timber were destroyed.

Cairo, Ill.: high westerly wind, with light rain at intervals, prevailed on the 27th; maximum velocity of the wind, thirty-two miles per hour. A thunder-storm, accompanied by heavy hail, occurred during the afternoon. The hail-stones were the size of marbles, and remained on the ground unmelted about an hour. The high wind and hail were very destructive to fruit trees in this vicinity, nearly stripping them of blossoms. The hail storm was severe at Paducah, Ky., the stones being as large as walnuts.

Lynchburg, Va.: a heavy thunder-storm, with hail and snow, occurred in Tazewell county on the 31st.

Hail is also reported to have occurred, as follows:

Arkansas.—Little Rock, 27th.

California.—Nicolaus, 3d.

Colorado.—Montrose, 26th.

Florida.—Limona, 17th.

Georgia.—Milledgeville, 28th.

Idaho.—Coeur d'Alene, 29th.

Illinois.—South Evanston, 5th, 27th; Cairo, 20th, 21st, 27th; Jacksonville and Pekin, 27th.

Indiana.—Indianapolis, 5th.

Kansas.—El Dorado and Leavenworth, 8th; Independence, 8th, 26th; Fort Riley and Wakefield, 26th.

Kentucky.—Harper's Ferry, 6th, 27th; Frankfort, 27th.

Maine.—Cornish, 28th.

Maryland.—New Midway, 3d.

Massachusetts.—Amherst, 6th, 27th; Somerset and Westborough, 19th.

Mississippi.—Vicksburg, 27th.

Missouri.—Saint Louis, 27th.

Nebraska.—Brownville, 8th; Tecumseh, 26th.

New Jersey.—Dover, 2d, 5th; Clayton, 3d; Moorestown, 3d, 22d; Atlantic City, 28th.

New York.—Brooklyn, 3d; Factoryville, 22d, 27th; Setauket, 22d, 28th; Madison Barracks, 28th.

North Carolina.—Reidsville, 26th, 31st.

Ohio.—Garrettsville, 5th; Elyria, 12th; Napoleon, 27th.

Pennsylvania.—Wellsborough, 5th; Dyberry, 6th, 28th; Bethlehem and Grampian Hills, 28th.

South Carolina.—Spartanburg, 4th; Stateburg, 28th.

Tennessee.—Milan, 21st; Nashville and Memphis, 27th.

Texas.—Austin, 8th.

Virginia.—Chincoteague, 5th; Lynchburg and Rappahannock, 9th.

Washington Territory.—Neah Bay, 13th; Spokane Falls, 29th.

SLEET.

Sleet fell in the various states and territories during the month as follows: Lead Hill, Ark., 21st. New London, Conn., 6th. Fort Sully, Dak., 7th. Cape Henlopen, Del., 4th. Washington City, 4th, 5th, 8th. Mattoon, Ill., 2d; Springfield, Ill., 5th, 26th, 27th; Rockford, Ill., 6th. Butlerville and Fort Wayne, Ind., 5th. Cresco, Iowa, 20th; Keokuk, Iowa, 27th; Fort Madison, Iowa, 31st. Eastport, Me., 22d, 28th. Baltimore, Md., 3d, 5th. Marquette, Mich., 8th; Mackinaw City, Mich., 9th. Saint Paul, Minn., 30th. Saint Louis, Mo., 4th, 21st, 26th, 27th. Poplar River, Mont., 7th. Hay Springs, Nebr., 22d. Dover, N. J., 10th; Beverly, N. J., 28th. Oswego and West Point, N. Y., 6th; Palermo, N. Y., 6th, 27th, 28th; Albany, N. Y., 6th, 28th; Fort Columbus, N. Y., 22d; Plattsburg Barracks and Le Roy, N. Y., 27th. Raleigh, N. C., 28th; Hatteras, N. C., 29th; Charlotte and Statesville, N. C., 31st. Cincinnati, Cleveland, Napoleon, and Yellow Springs, Ohio, 5th; Wauseon, Ohio, 5th, 11th, 12th, 21st, 27th; Columbus, Ohio, 5th, 14th; Garrettsville, Ohio, 5th, 27th. Philadelphia, Pa., 3d; Pittsburg, Pa., 5th; Dyberry, Pa., 28th. Snowville, Va., 4th, 8th. Tatoosh Island, Wash., 18th. Parkersburg, W. Va., 4th, 5th, 19th, 20th. Milwaukee and Embarras, Wis., 6th, 24th; Fond du Lac, Wis., 9th. Camp Sheridan, Wyo., 19th, 26th, 30th.

Table of excessive and greatest monthly precipitation for March, 1887.

Station.	Specially heavy.		Largest monthly.	Station.	Specially heavy.		Largest monthly.
	Date.	Amt.			Date.	Amt.	
<i>Arkansas.</i>				<i>Massachusetts—C'd</i>			
Lead Hill.....	6	2.02		Williamstown.....	5, 6	2.24	
<i>Alabama.</i>				New Bedford.....	10, 11	2.20	
Florence.....	7	2.00		<i>New York.</i>			
<i>Colorado.</i>				White Plains.....	17	2.12	9.91
Pike's Peak.....	26	2.06		Do.....	21, 22	3.20	
<i>Florida.</i>				Do.....	27, 28	2.25	
Alva.....	25	5.50	7.55	Cooperstown.....	5, 6	2.00	
Tallahassee.....	8	2.40		<i>Ohio.</i>			
Duke.....	27, 28	2.12		Jacksonborough..	4, 5	2.40	
Archer.....	27, 28	3.50		Jefferson.....	5, 6	2.08	
Jacksonville.....	27, 28	2.04		Levering.....	5, 6	2.01	
<i>Illinois.</i>				<i>Oregon.</i>			
Flora.....	5	4.51	6.56	Astoria.....	3	3.23	16.11
Olney.....	5, 6	4.00	6.00	Do.....	6 to 10	5.97	
Collinsville.....	4, 5	2.54		Mount Angel.....	5, 6, 7	5.06	10.30
Mattoon.....	5	2.23		Albany.....	4, 5, 6	4.60	9.03
Charleston.....	5	2.10		Portland.....			8.00
Summer.....	6	4.10		Bandon.....	5, 6	3.47	7.07
Palestine.....	5, 6	3.25		Eola.....			6.41
Vandalia.....	5, 6	2.25		East Portland.....			6.34
Centralia.....	5	4.50		<i>Tennessee.</i>			
Irishtown.....	5, 6	3.10		Milan.....	5, 6	2.18	
Mascoutah.....	6	3.30		Cookeville.....	7	2.00	
Albion.....	5, 6	4.00		Florence Station..	6	2.87	
Fairfield.....	5, 6	3.50		Hurricane Switch..	6, 7	3.34	
Richview.....	5, 6	4.02		Ashwood.....	6, 7	2.82	
Three Mile.....	5	2.00		Waynesborough..	6, 7	3.10	
Jordan's Grove.....	5	3.50		Waverly.....	6, 7	2.06	
<i>Indiana.</i>				Savannah.....	6, 7	2.27	
Shuman.....	5, 6	2.30		Woodstock.....	6	2.35	
Butlerville.....	5, 6	2.15		Memphis.....	6, 7	3.00	
<i>Iowa.</i>				Knoxville.....	7	2.07	
Cedar Rapids.....	26, 27	2.00		Chattanooga.....	8, 9	2.20	
<i>Kentucky.</i>				<i>Vermont.</i>			
Harper's Ferry.....	27	2.30	6.80	Townsend.....			7.52
<i>Maine.</i>				<i>Virginia.</i>			
Gardiner.....	6	2.02	7.27	Rappahannock...	10	2.27	7.52
Do.....	10	2.58		Washington Ter.			
Orono.....	28, 29	2.90		Tatoosh Island..	8, 9, 10	7.07	16.36
Bar Harbor.....	28, 29	2.62		Do.....	15, 16, 17	2.92	10.60
<i>Massachusetts.</i>				Olympia.....	7, 8	2.29	10.60
Randolph.....			6.27	Blakely.....			8.60
Mansfield.....			6.24	Tacoma.....			7.77

DROUGHT.

New Ulm, Tex.: the total precipitation for January, February, and March, 1887, 4.36 inches, is 9.39 inches below the average of the same months during the past fifteen years. The total precipitation of the present month, 1.27 inches, is the least that has fallen in any March during that time. The voluntary observer at Corsicana and other places in the eastern part of Texas state that a protracted drought has prevailed since December, 1886.

San Antonio, Tex.: on the 31st the observer at this place reports, concerning the drought in Texas, as follows:

The drought in this section continues, little rain having fallen since the first frost which occurred November 18th; cattle and horses are dying in large numbers, chiefly from want of water. Market reports indicate that the number of fallen hides, or hides from cattle that have died on the range, handled this year has been unprecedentedly large. Several cattle owners in Atascosa and Frio counties are shipping their herds to the Indian Territory for pasturage. The agricultural outlook for this section is decidedly gloomy. Corn is coming up slowly, but if rain does not fall soon it will not make a stand, while oats, barley, and all small grain are regarded as complete failures.

Fort Grant, Ariz.: the observer at this place reports the total rainfall of the month to be a few drops on the 22d. The soil at the end of the month was exceptionally dry for the season and rain was needed badly. This section of the territory depends, from spring until early autumn, for its supply of water on the melted snow from the Graham Mountains, about five miles northeast of station. These mountains are usually

covered with snow at this season of the year. The absence of unmelted snow in this range during the present month indicates a severe drought for the coming summer, which will greatly damage the extensive cattle interests of this vicinity.

Fort Smith, Ark.: at the end of the month throughout Arkansas and the Indian Territory, vegetation of all kinds was suffering from lack of rain. Farmers stated that the ground was too hard to plow, and that crops already planted would be a failure unless rain fell shortly. The Arkansas River was very low and the cotton and lumber industries of this town were at a standstill, awaiting a rise in the river. Navigation was practically closed at all river ports above this place. The Canadian River in the Indian Territory, a tributary of the Arkansas, was lower than it has ever been before within the memory of the oldest settlers.

Wellington, Kans.: the voluntary observer at this place states that the month has been exceedingly dry, the total precipitation being only 0.22 inch. The growth of vegetation of all kinds was greatly delayed by want of moisture. At Salina the total fall of the month was only 0.01 inch, and crops were beginning to feel the effects of the drought.

Key West, Fla.: on the 12th, during a thunder-storm, 1.36 inches of rain fell; this rain ended a drought that had prevailed for several months and relieved the people of many inconveniences and discomforts. It was the only heavy rainfall since October 26, 1886, and the majority of the cisterns of the town had become dry.

WINDS.

Report of tornadoes for the month of March, 1887, by Lieut. John P. Finley, Signal Corps, U. S. Army, Assistant.

Place.	Date.	Time.	Direction.	Form of cloud.	Number of persons killed.	Number of persons wounded.	Width of path.	Number and kind of animals killed.	Number and kind of buildings destroyed.	Total valuation of property destroyed.	Authority.
Tampa, Fla.	17	5 p. m.	ne.	.....	2	Several	Feet. Narrow	None	Several houses.....	\$10,000	J. G. Knapp, Limona, Fla.; "New York World," March 19, 1887.
Topin's Grove and Ripley, W. Va.	24	4.30 p. m.	ne.	Funnel	None	None	1,720	.....	Court house and residences.	.....	N. A. Duffield, Rock Castle; P. B. Vanham, Topin's Grove, W. Va.
Burton, W. Va.	24	6.30 p. m.	ne.	.....	None	None	.....	None	10 houses and barns besides many unroofed; fences demolished.	.....	A. V. McDonnell, Burton, W. Va.
Hockingport, Ohio	24	4 p. m.	ne.	.....	None	None	.....	None	Several	.....	Neal White, Hockingport, Ohio.
Vinton, Ohio	24	5 p. m.	ne.	.....	None	None	.....	None	Several	.....	Hiram Wilcox, Vinton, Ohio.
Point Pleasant, W. Va.	24	5 p. m.	ne.	.....	None	None	Narrow	.....	10 houses unroofed, fences destroyed, and timber blown down.	.....	F. D. Hay, Point Pleasant, W. Va.
Tyler Creek, W. Va.	24	5 p. m.	ne.	.....	None	Several	Narrow	.....	Houses unroofed and trees prostrated.	.....	F. M. Swann, Tyler Creek, W. Va.
Ripley, W. Va.	24	6 p. m.	ne.	.....	.....	.....	Narrow	None	Court house and other buildings.	2,800	Jackson County "Herald," W. Va.
Lincoln, Ohio	24	4 to 8 p. m.	ne.	.....	None	None	Narrow	None	Great destruction of property.	.....	M. M. Walter, Lincoln, Ohio.
Murraysville, W. Va.	24	About 4 p. m.	ne.	Funnel	.....	.....	Narrow	.....	.....	.....	D. K. Barrett, Murraysville, W. Va.
Evergreen, Ohio	24	About 5 p. m.	easterly	.....	.....	.....	.....	.....	12 to 15 buildings destroyed, with damage to other property.	.....	J. H. Morris, Evergreen, Ohio.
Roney's Point, W. Va.	24	5.30 p. m.	ne.	.....	.....	.....	Narrow	None	Buildings unroofed and other damage.	.....	Thomas J. Orr, Roney's Point, W. Va.
Pilot Point, Tex.	26	5.30 p. m.	ne.	.....	None	None	Narrow	.....	Very destructive.....	.....	J. B. Pondron, Pilot Point, Tex.
Bigbyville, Tenn.	27	4.30 p. m.	ne.	.....	.....	.....	90	None	Very destructive.....	.....	O. F. Williams, Ashwood, Tenn.
Bartow and near Moxley, Ga.	31	6 p. m.	ne.	Funnel	None	None	600 to 900	None	Considerable damage to houses, timber, and fences.	.....	W. H. H. Stewart, Bartow; James A. Thigpen, Wadley; B. S. Carswell, Moxley, Ga.

a A large and very dark cloud, covering the nw. horizon and moving rapidly from nw. to se. and then e. Storms of this character very uncommon in this locality.

b A large quantity of water in the Ohio River was lifted by the force of the wind and carried some two hundred and fifty yards.

c The funnel-shaped cloud appeared in the w., having a light color at the lower end and very dark above. There was a heavy roaring noise on the approach of the storm.

d A copper-colored cloud was seen to approach from the nw., preceded by light, feathery clouds.

e Two very dark clouds, one from sw. and the other from the w., rolled and tumbled in wild commotion, accompanied by loud noise, and then moved to the e.

f Cloud first formed twenty miles sw. of Bartow.

The most frequent directions of the wind during March, 1887, are shown on chart ii by the arrows flying with the wind; they are also given in the table of miscellaneous data. The general movement of the air over the eastern half of the

country, except in Florida and the Gulf States, has been from the northwest; along the coast of Washington Territory and Oregon, from the south or southwest. In other parts of the country the wind-direction was variable.